

Appl. No. 10/823,101
Amdt. Dated September 29, 2005
Reply to Office action of June 29, 2004

Amendments to the Specification:

Please amend the specification as follows:

[0010] ~~[[Fig.]] FIG.~~ 1 is an exploded, isometric view of a hinge device in accordance with the present invention;

[0011] ~~[[Fig.]] FIG.~~ 2 is an enlarged, isometric cutaway view of a seat of the hinge device of ~~[[Fig.]] FIG.~~ 1, corresponding to line II-II thereof;

[0012] ~~[[Fig.]] FIG.~~ 3 is a schematic expanded view of an inside of the seat of ~~[[Fig.]] FIG.~~ 2, showing a railway thereof with exaggerated curvature;

[0013] ~~[[Fig.]] FIG.~~ 4 is a graph showing a relationship between an angle of swiveling of a display of an electronic device employing the hinge device of ~~[[Fig.]] FIG.~~ 1 and a vertical distance between the display and a base of the electronic device (X: ~~angel~~ angle of swiveling; Y: vertical distance);

[0014] ~~[[Fig.]] FIG.~~ 5 is an assembled view of ~~[[Fig.]] FIG.~~ 1, but ~~view~~ viewed from another aspect;

[0015] ~~[[Fig.]] FIG.~~ 6 is a cross-sectional view taken along line VI-VI of ~~[[Fig.]] FIG.~~ 5; and

[0016] ~~[[Fig.]] FIG.~~ 7 is an isometric of a notebook computer employing the hinge device of ~~[[Fig.]] FIG.~~ 1.

[0017] Referring to ~~[[Figs.]] FIGS.~~ 1 and 7, a hinge device in accordance with the present invention is for pivotably coupling a display 70 to a base

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80 of an electronic device such as a notebook computer. The hinge device comprises a pair of first hinges 100 and a second hinge 200.

[0018] Each first hinge device 100 comprises a first rotating member 11 and a second rotating member 13. The first rotating member 11 rotationally engages with the second rotating member 13. Each of the first and second rotating ~~member~~ members 11, 13 comprises a connecting board (not labeled) extending from an end thereof. A plurality of securing holes (not labeled) is defined in each connecting board. Fasteners (not shown) are extended through the securing holes of the connecting board of the second rotating member 13 to attach the first hinge 100 to the display 70.

[0019] Referring also to [[Figs.]] FIGS. 2 and 3, the second hinge 200 comprises a [[base]] seat 30, a rotor 40, a roller 50 and a locator 60.

[0020] The [[base]] seat 30 comprises a cylindrical body 31. A block 32 extends rearwardly from an outer circumferential surface of the cylindrical body 31. The block 32 forms a planar rear wall 39. A plurality of connecting tabs 33 extends outwardly from bottom portions of the cylindrical body 31 and the block 32. A through aperture 34 is defined in each connecting tab 33. The cylindrical body 31 defines a central through hole 35 therein. A railway 36 is defined in an inner wall of the cylindrical body 31. A path of the railway 36 is generally sinusoidal and traces two complete cycles. An imaginary line between crest points of the railway 36 corresponding to lines B and D is perpendicular to the rear wall 39 of the block 32. An imaginary line between trough points of the railway 36 corresponding to lines A and C is parallel to the rear wall 39. A vertical guide channel 37 is defined in the inner wall of the cylindrical body 31 corresponding to line A, spanning from a top of the cylindrical body 31 to

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the railway 36. A threaded locating hole 38 is defined through the block 32 and the cylindrical body 31.

[0022] Referring to [[Fig.]] FIG. 6, the locator 60 comprises a cup 61 having an outer thread, a spring 62, and a ball 63. The spring 62 abuts against an inside bottom of the cup 61. The ball 63 abuts against an outmost end of the spring 62.

[0023] Referring to [[Figs.]] FIGS. 1, 5, 6 and 7, in assembly, the seat 30 is arranged in the base 80, with the rear wall 39 of the block 32 facing rearward. Fasteners (not shown) are extended through the through apertures 34 of the seat 30 and engaged with the base 80, thereby securing the seat 30 in the base 80. The roller 50 is placed in the socket 45 of the rotor 40. The combined rotor 40 and roller 50 is attached to the seat 30, with the roller 50 sliding along the guide channel 37. The shaft 42 of the rotor 40 is pivotally received in the through hole 35 of the seat 30, and the roller 50 is tightly held between the socket 45 of the rotor 40 and the railway 36 of the seat 30. Fasteners (not shown) are extended through the securing holes of the second rotating members 13 to attach the first hinges 100 in the display 70. Fasteners (not shown) are extended through the securing hole of the first rotating members 11 and the securing holes of the beams 43 of the rotor 40 to attach the first hinges 100 to the second hinge 200. The locator 60 is threaded into the locating hole 38 of the seat 30. The locator 60 is used to locate the rotor 40 in discrete positions as the rotor 40 is rotated in the seat 30, with the ball 63 engaging in respective vertical flutes 421 of the rotor 40.

[0024] Referring also to [[Fig.]] FIG. 4, the display 70 can swivel in clockwise and counter-clockwise directions relative to the base 80, with the

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shaft 42 of the rotor 40 rotating in the through hole 35 of the seat 30. During such swiveling, the roller 50 moves along the railway 36. Thus, a height of the rotor 40 relative to the seat 30 changes, and a distance of the display 70 from the base 80 changes accordingly. That is, the distance between the display 70 and the base 80 progressively changes during swiveling according to the sinusoidal curve of the railway 36. For example, when the beams 43 of the rotor 40 are aligned with the imaginary line between the trough points corresponding to lines A and C, the distance between the rotor 40 and the seat 30 is a minimum distance. When the display 70 is then swiveled in either direction, the rotor 40 gradually rises relative to the seat 30. When the beams 43 are aligned with the imaginary line between the crest points corresponding to lines B and D, a distance between the rotor 40 and the seat 30 is a maximum distance. When the display 70 is further swiveled in the same direction, the rotor 40 gradually moves lower relative to the seat 30.